STANDARD BRIDGE CO.

PREDESIGN – PREFAB STEEL BRIDGE / PIER SYSTEMS
THE NEW STANDARD

GIRDER TEST RESULTS

On Thursday, Jan. 15, 2009 testing was conducted on a new design concept based on Compression Theory perfected by Dennis A. Vodicka.

The test was supervised and partnered with the University of Nebraska at Omaha, Engineering Dept. with Dr. Tadros / Dr. Morcous and Standard Bridge Co. LLC of Eagle Nebraska.

The test Beam is a built-up Roll Beams of two end section W18x130 with a W12x96 welded together and one keystone section W18x130, with HP12x52 girder seats. The design test girder represents a 45'-0" span girder with 9'-0" girder spacing and noncomposite with two compression splices of 20 bolts each.

GOAL OBJECTIVES;

1. Find maximum carrying capacity for a girder designed for HS-25 using Vodicka's Compression Theory with a modified Fixed End Moment distribution.

2. Prove that Vodicka's Compression Splice placed the Girder in total Compression and all the welds in the end sections are compression welds and not critical design welds.

3. Prove that fabricating a three piece girder system is cheaper and easier to built, transport and erect.

RESULTS;

1. **Finding maximum carrying capacity;**

   Due to the limits of the University of Nebraska at Omaha Lab; we did not get the girder end fixed as designed. The concrete support beams provided by the lab could not be secured and so they slipped. Because of this we were no longer in a Fixed End Moment distribution, but were placed in Simple Span Moment distribution. Due to this, the girder acted differently, but was still able to carry HS-25 design load, (68 kips or **40,000** lb Axle load). But instead of only having a **.25"** dead load deflection as designed, we ended up with a **2.656"** DL & LL deflection. This is common when using Simple Span Moment distribution.

   Technically the W18x130 should have never worked under Simple Span Moment distribution, as this placed the stresses for the HS-25 design up to **60** ksi. But if we could have fixed the ends in the Lab under Vodicka's Compression Theory, the stresses for the W18x130 would have only been **42** ksi.

   This is where Vodicka's Compression Splice kicked in. The splice gave the W18x130 strength by putting the girder into compression and was able to carry **142** kips (HS-50 or 80,000 lb axle load) with a **6.875"** dead load deflection. After the load was released, with the Girder bending to **6.875",** the girder returned to 90% of normal with only **.75"** permanent deflection. This proves that the girder went into Plastic Modulus using the 56 ksi allowable. No Bridge in the United States is designed to carry the extreme event of an **80,000** lb axle load and not fail, but today we have proven that there is a girder system that can carry this load.

STANDARD BRIDGE CO.

PREDESIGN – PREFAB STEEL BRIDGE / PIER SYSTEMS
THE NEW STANDARD

As tested, this girder would work ideally in an Integral Abutment Design. Today we have proved that the girder, as designed, did carry the HS-25 truck with an extreme event load placed on it. Even though we were not able to prove the true extreme event load that this girder is capable of carrying, (by not getting fixity at the girder ends) it worked in simple moment distribution.

RESULTS;

2. **Vodicka's Compression Splice;**
   The Compression Splice worked perfect. It turned Tension stresses into Compression stresses and the proof is that the W18x130 should have never worked for the 45'-0" span bridge with 9'-0" girder spacing. There was no cracking of any of the welds, especially the web weld under the compression splice.

3. **Fabricating a three piece Girder System;**
   It took only three days to fabricate using a 4 ton Forklift. Each piece weighed in at around 3100 lbs for a total weight of 9300 lbs. For transportation, all we needed was a 5 ton goose neck trailer and ¾ ton pickup. All that was left was to bolt the compression splice together using 20 – 7/8" bolts in the field or at the lab, lifting the finished girder and placing these girders into an Integral Abutment girder seat.

Dennis A. Vodicka
Structural Bridge Designer
Standard Bridge Co., LLC
206 8th Corso
Nebraska City, NE 68410
402-873-8172
davodicka@windstream.net

STANDARD BRIDGE CO.

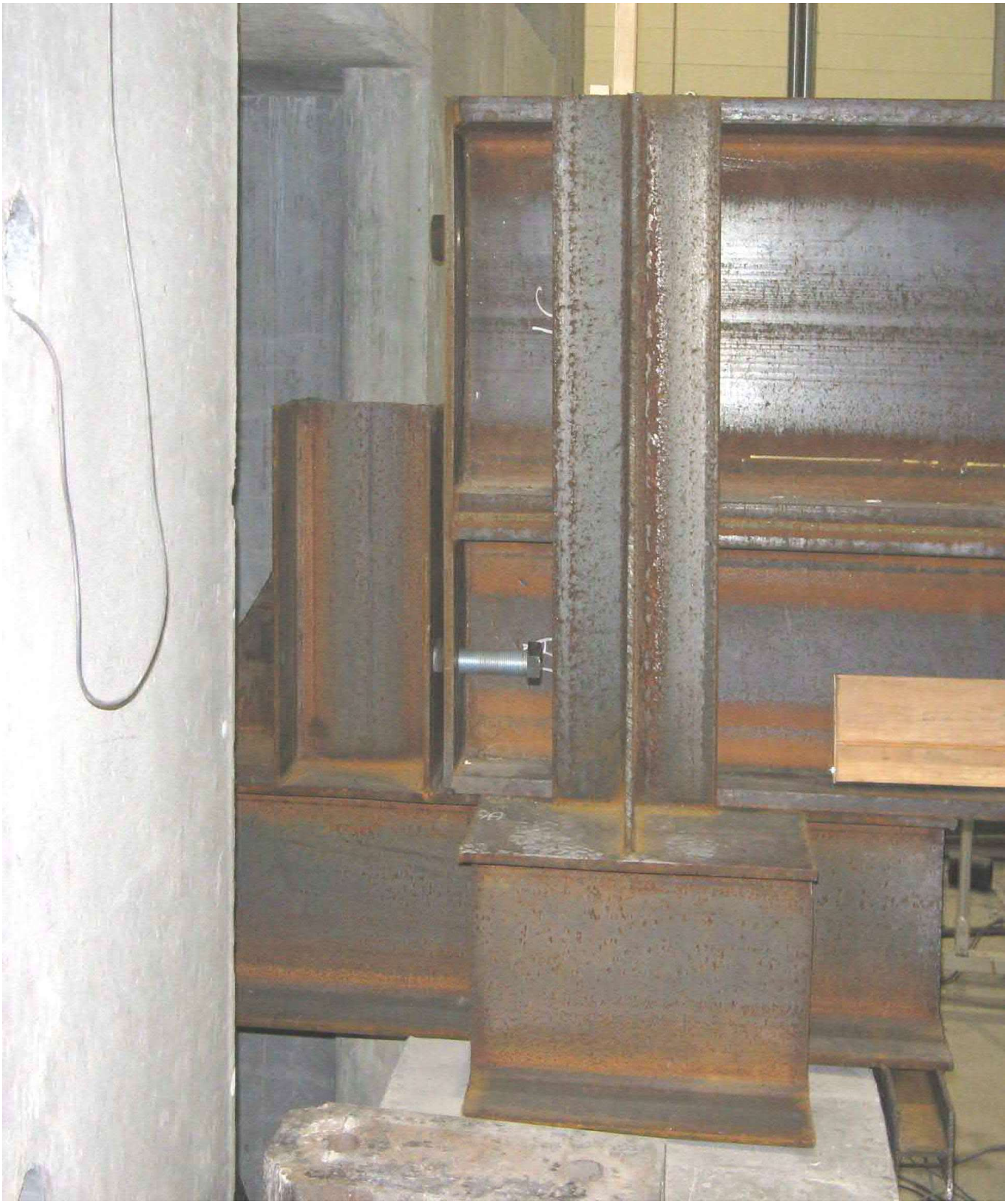
PREDESIGN – PREFAB STEEL BRIDGE / PIER SYSTEMS

THE NEW STANDARD

STANDARD BRIDGE CO.

PREDESIGN – PREFAB STEEL BRIDGE / PIER SYSTEMS

THE NEW STANDARD



STANDARD BRIDGE CO.

PREDESIGN – PREFAB STEEL BRIDGE / PIER SYSTEMS

THE NEW STANDARD

STANDARD BRIDGE CO.

PREDESIGN – PREFAB STEEL BRIDGE / PIER SYSTEMS

THE NEW STANDARD